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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Masahiro Goto

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EXAMINER

BAND, MICHAEL A

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

03/09/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/553,848	Applicant(s) GOTO ET AL.	
	Examiner MICHAEL BAND	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 20-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 20-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-5 and 20-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 contains the limitation requiring cooling the remainder of the plurality of substrates in the cooling position to a temperature which is not influenced by the heating of the substrates in the deposition position. Claim 1 contains the limitation requiring a prescribed temperature is different among the plurality of substrates sequentially moved to the deposition position and heated. There is no support for these limitations in the Specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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4. Claims 1-3, 5, and 20-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al (US Patent No. 4,747,928).

With respect to claims 1, 3, and 22-24, Takahashi et al discloses a substrate processing apparatus to form a thin film and cooled via cooling mechanism (abstract; col. 3, lines 28-32), where fig. 1 depicts the substrates (i.e. cassette) [11] where the substrates contained in the cassette [11] are transported to a sputter chamber [40] where said substrates are rotated counter-clockwise [104]-[106] from stages D, E, F, and G (col. 3, lines 28-55). Fig. 2 depicts a more detailed view of the sputtering chamber [40], where the substrates rotate sequentially from stage F at a first deposition cathode [43] at a first optimum (i.e. prescribed) temperature to the cooling mechanism [200] at stage G to a second optimum (i.e. prescribed) temperature (col. 3, lines 28-55; col. 4, lines 7-19). Takahashi et al also discusses in fig. 2 a heat lamp [42] at stage E for heating the substrate and depositing a first film from the first cathode [43]. Since the heat lamp [42] is on the opposite side of the cooling mechanism [200], the cooled substrates are not influenced by the heat lamp [42]. Fig. 2 also depicts the temperatures are different for the sequentially moved plurality of substrates from stage D, to stage, E, to stage F, to stage G.

With respect to claims 2, 5, and 20-21 Takahashi et al further discloses in fig. 2 a heat lamp [42] at stage E for heating the substrate before depositing a first film from the first cathode [43], where the substrates are then cooled via cooling mechanism [200] before a second film is deposited via a second cathode [44] at stage G (col. 3, lines 41-55), thus the substrate temperatures are altered resulting in different deposition conditions. Takahashi et al also discloses depositing two distinct materials from the first

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cathode [43] and the second cathode [44] by using different temperatures for the different films (col. 1, lines 61-65; fig. 2). In addition since different materials are used for the two cathodes, different power, sputter gas pressures, and sputter gas types are used to sputter the two distinct materials. As merely an example, a Ti (titanium) target (i.e. first cathode) with nitrogen/argon gas might be used to deposit an insulating first layer on the wafer, followed by a Cu (copper) (i.e. second cathode) with only argon gas might be used to deposit a conductive second layer on said wafer.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al (US Patent No. 4,747,928) as applied to claim 1 above, and further in view of Gauger (US Patent No. 3,620,956).

With respect to claim 4, Takahashi et al further discloses in fig. 8 the substrate cooling mechanism [200] where a heat sink [233] transfers the heat generated from the wafer at stage G via cooling medium (i.e. fluid) inside an internal space [235] inside said heat sink [233], where said cooling medium is conducted into said internal space [235] via pair of coil-shaped pipes [234] (col. 8, lines 54-59). However Takahashi et al is limited in that the specific type of cooling medium is not suggested.

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Gauger teaches a mechanism for thin film deposition via sputtering using heating and cooling means and rotating a substrate past two or more stations (abstract; col. 1, lines 5-31). Gauger further teaches disposing around the outside of the substrate are cooling coils to provide a means for circulating a coolant, preferably water, to cool said substrate (col. 2, lines 10-14).

It would have been obvious to one ordinary skill in the art to use water as taught in Gauger for the substrate cooling medium of Takahashi et al since Takahashi et al fails to specify a specific cooling medium and one of ordinary skill would have a reasonable expectation of success in making the modification since Gauger has shown success in cooling a substrate using water.

Response to Arguments

112 Rejections

7. The Applicant has amended the claims to no longer be indefinite; the rejections under 35 USC 112, second paragraph are withdrawn.

102 Rejections

8. Applicant's arguments filed 1/6/2009 have been fully considered but they are not persuasive.

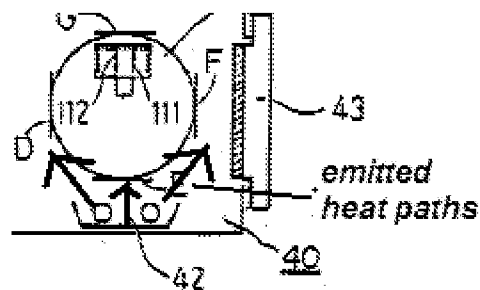
9. On p. 8-9, the Applicant argues that Takahashi et al fails to disclose two or more substrates being in the same vacuum chamber. The Applicant also argues that Takahashi et al fails to disclose a deposition position in which a substrate is heated while being subjected to deposition. The Applicant also argues that Takahashi et al fails

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to disclose cooling a remainder of the substrates which are located in a cooling position.

The Applicant also argues that Takahashi et al fails to disclose heating sequential substrates to different prescribed temperatures.

The Examiner respectfully disagrees. Takahashi et al discloses a plurality of wafers (i.e. substrates) are inserted into a cassette [11], where said cassette (i.e. plurality of wafers) [11] is transported to the sputter chamber [40] (col. 19-30; fig. 1), thus a plurality of substrates (i.e. cassette [11]) are simultaneously in the same vacuum chamber (i.e. sputter chamber [40]). With regards to heating the substrates while being subjected to deposition, there is no claim limitation requiring heating the substrate while subjecting said substrate to deposition. However Takahashi et al discloses in fig. 1 a heat lamp [42] heating the substrates at stage F during deposition since there exists no partition between stage E and F to prevent the heat from said heat lamp [42] to stage F. The cropped figure below of fig. 2 serves to further clarify the heat from heat lamp [42] being present in stage F.



With regards to cooling a remainder of substrates, Takahashi et al discloses the wafers (i.e. substrates) are transported sequentially from stages D, E, F, G (col. 4, lines 8-19), thus one wafer is is at stage D, while another wafer, is at stage E, while another wafer is at stage F, while another wafer is at stage G, therefore a remainder of wafers is cooled.

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With regards to heating sequential substrates to different prescribed temperatures, the Examiner submits the following: "Takahashi et al further discloses in fig. 2 a heat lamp [42] at stage E for heating the substrate before depositing a first film from the first cathode [43], where the substrates are then cooled via cooling mechanism [200] before a second film is deposited via a second cathode [44] at stage G (col. 3, lines 41-55), thus the substrate temperatures are altered resulting in different deposition conditions. Takahashi et al also discloses depositing two distinct materials from the first cathode [43] and the second cathode [44] by using different temperatures for the different films (col. 1, lines 61-65; fig. 2)".

103 Rejections

10. All other arguments are directed towards the subject matter above and have been addressed accordingly.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795